OIPE IAP50
SEP 16 2005
PATENT & TRADEMARK OFFICE

FIG. 1

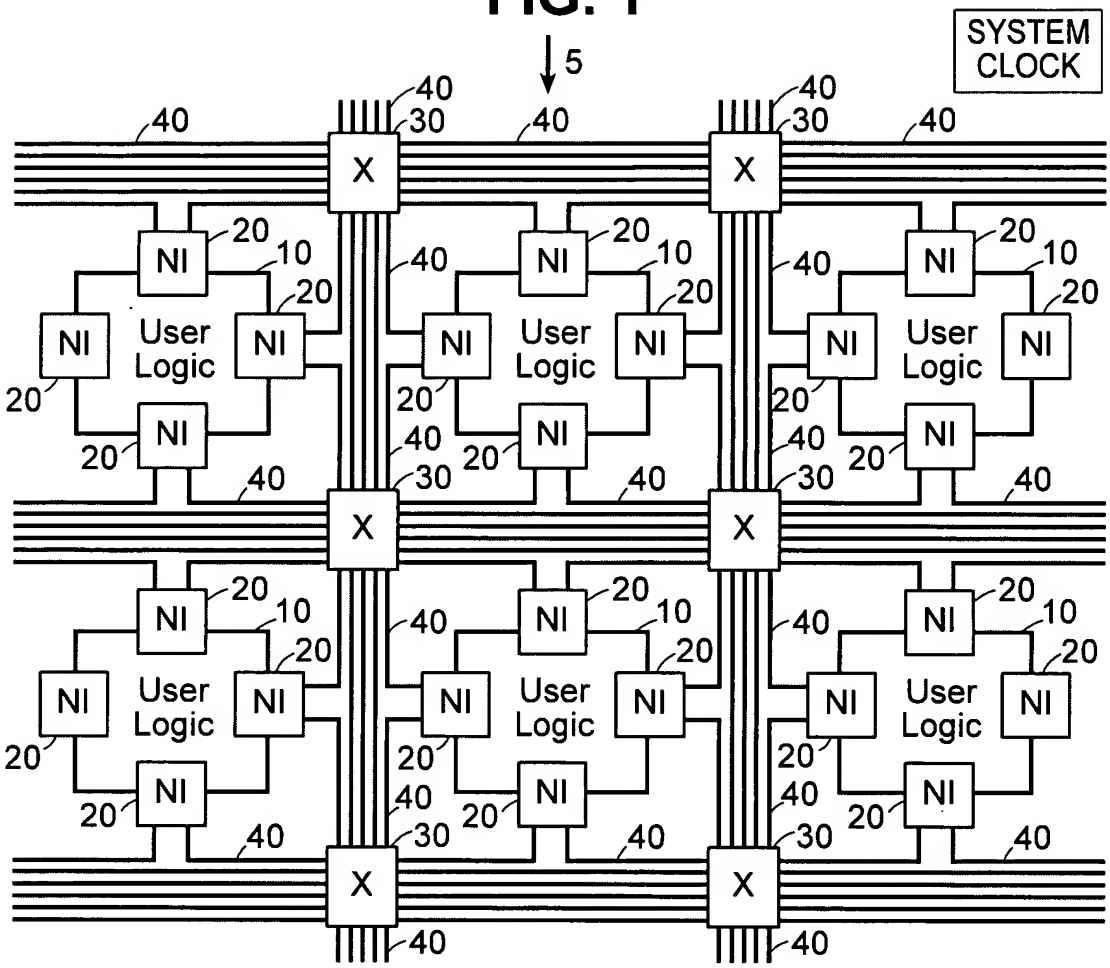


FIG. 2

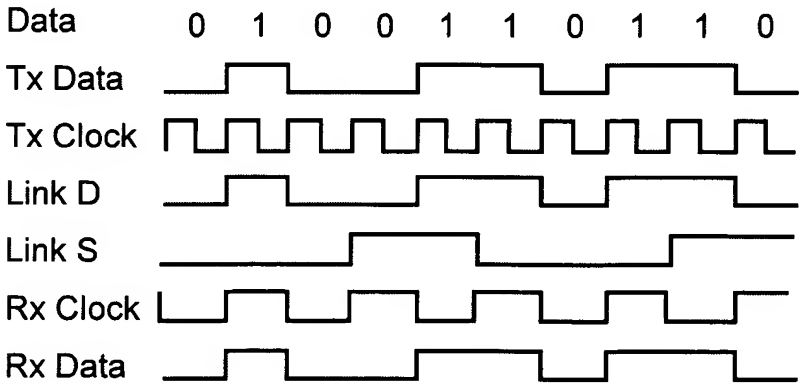


FIG. 3

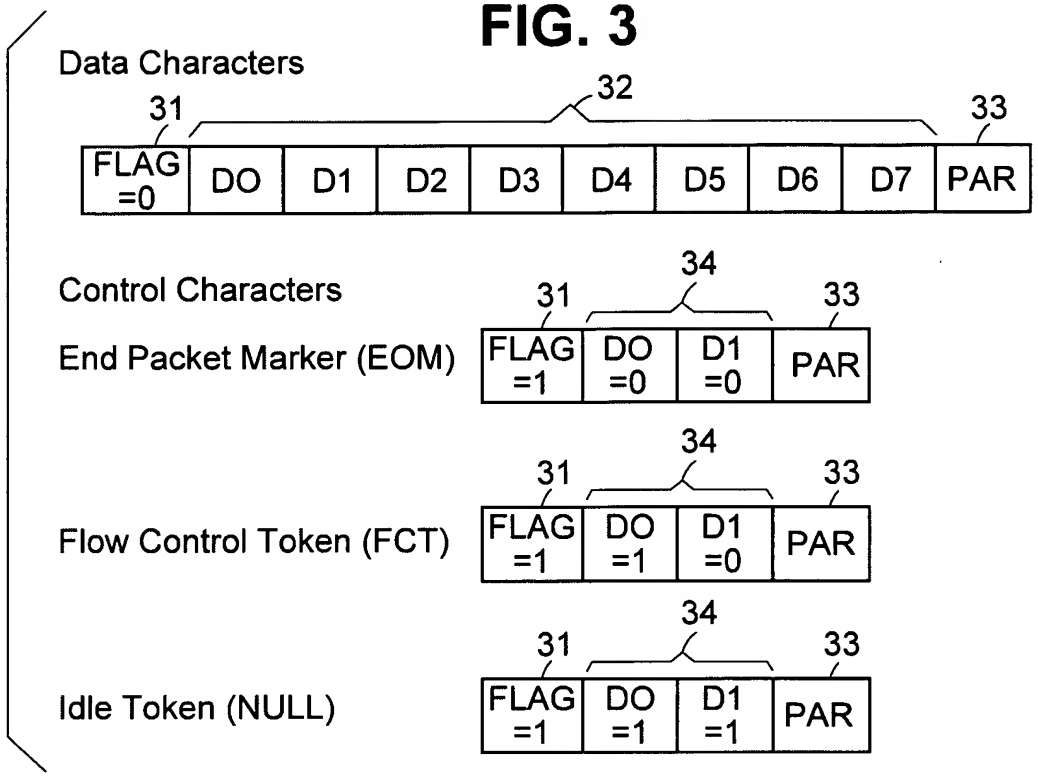

Data Characters
31
32
33
FLAG =0
DO
D1
D2
D3
D4
D5
D6
D7
PAR
Control Characters
End Packet Marker (EOM)
34
FLAG =1
DO =0
D1 =0
Flow Control Token (FCT)
DO =1
D1 =0
Idle Token (NULL)
D1 =1

FIG. 4

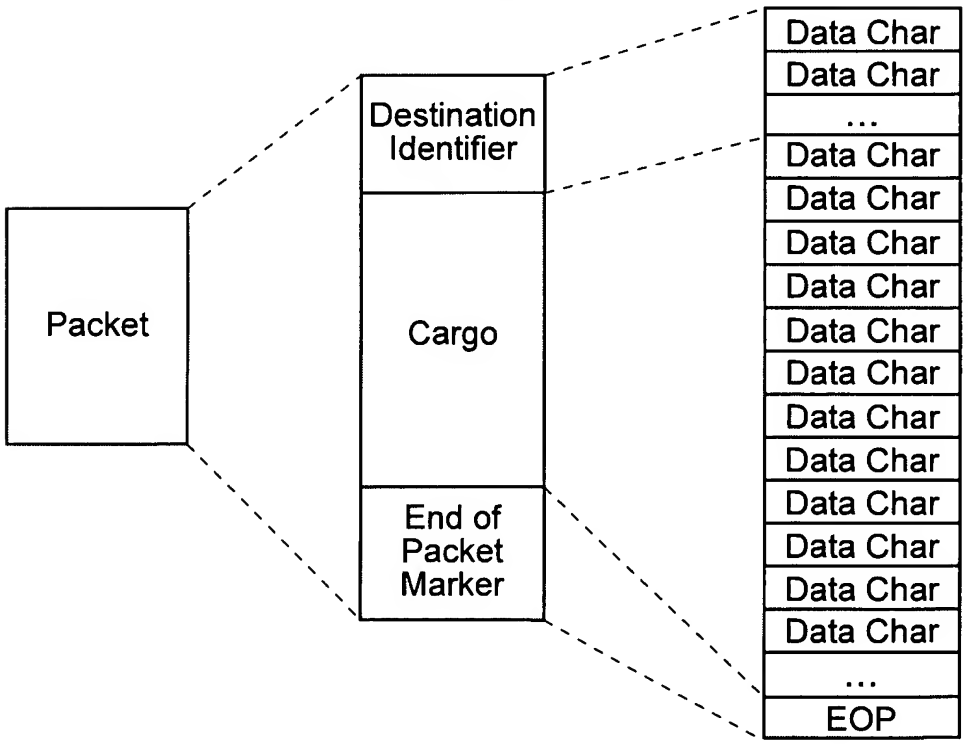

Packet
Destination Identifier
Cargo
End of Packet Marker
Data Char
...
EOP

FIG. 5

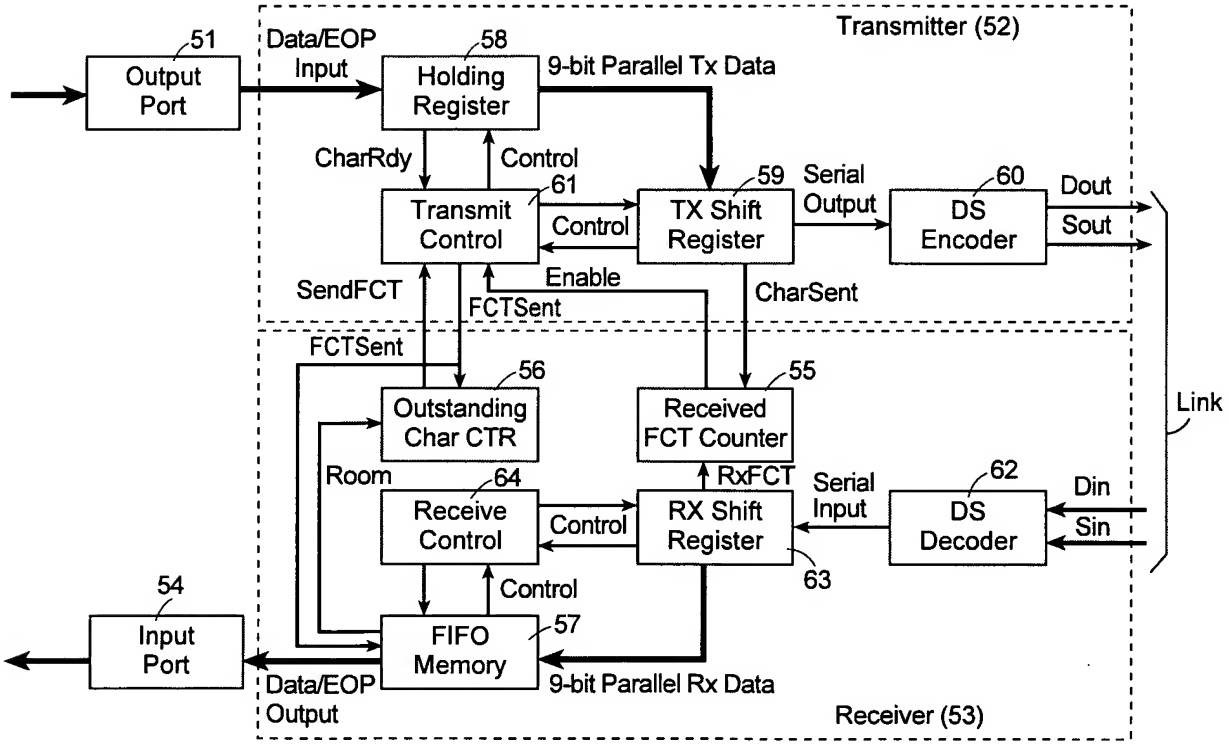

Transmitter (52)
51
Output Port
Data/EOP Input
58
Holding Register
9-bit Parallel Tx Data
CharRdy
Control
61
Transmit Control
Control
59
TX Shift Register
Serial Output
60
DS Encoder
Dout
Sout
SendFCT
FCTSent
Enable
CharSent
FCTSent
56
Outstanding Char CTR
55
Received FCT Counter
Link
Room
64
Receive Control
Control
RxFCT
RX Shift Register
Serial Input
62
DS Decoder
Din
Sin
63
Control
54
Input Port
57
FIFO Memory
Data/EOP Output
9-bit Parallel Rx Data
Receiver (53)

FIG. 6

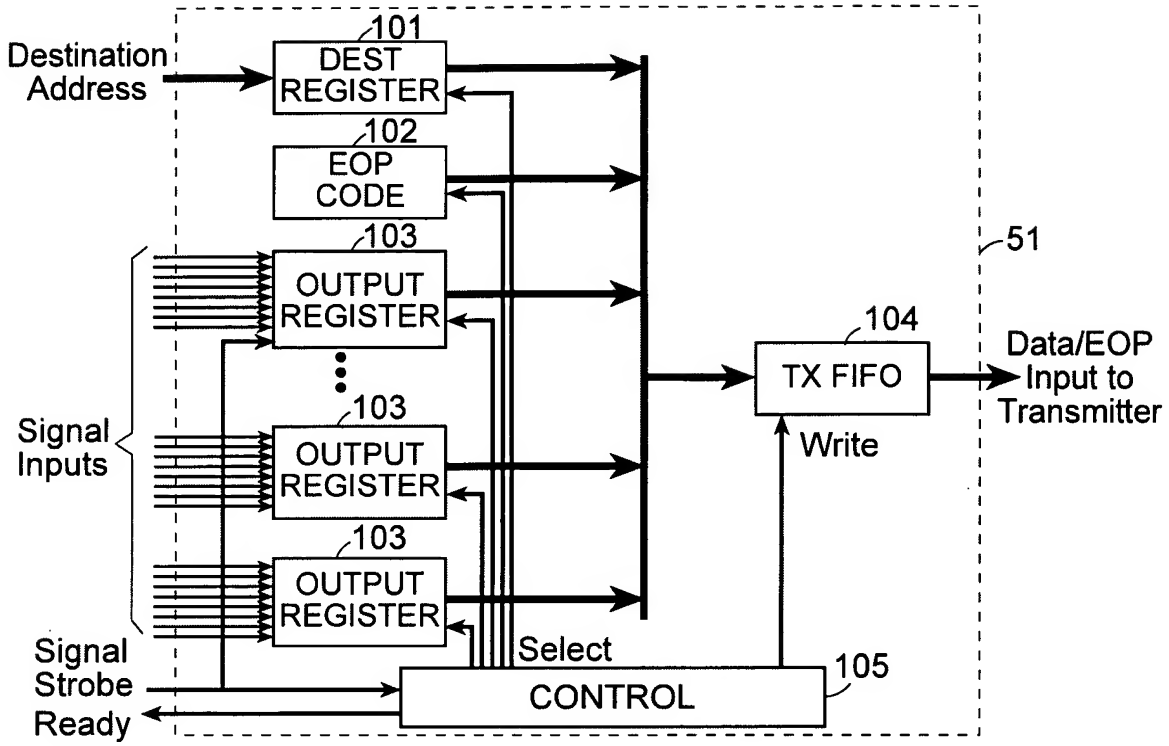

Destination Address
101
DEST REGISTER
102
EOP CODE
103
OUTPUT REGISTER
103
OUTPUT REGISTER
103
OUTPUT REGISTER
51
104
TX FIFO
Data/EOP Input to Transmitter
Write
Signal Inputs
Signal Strobe
Ready
Select
105
CONTROL

FIG. 7

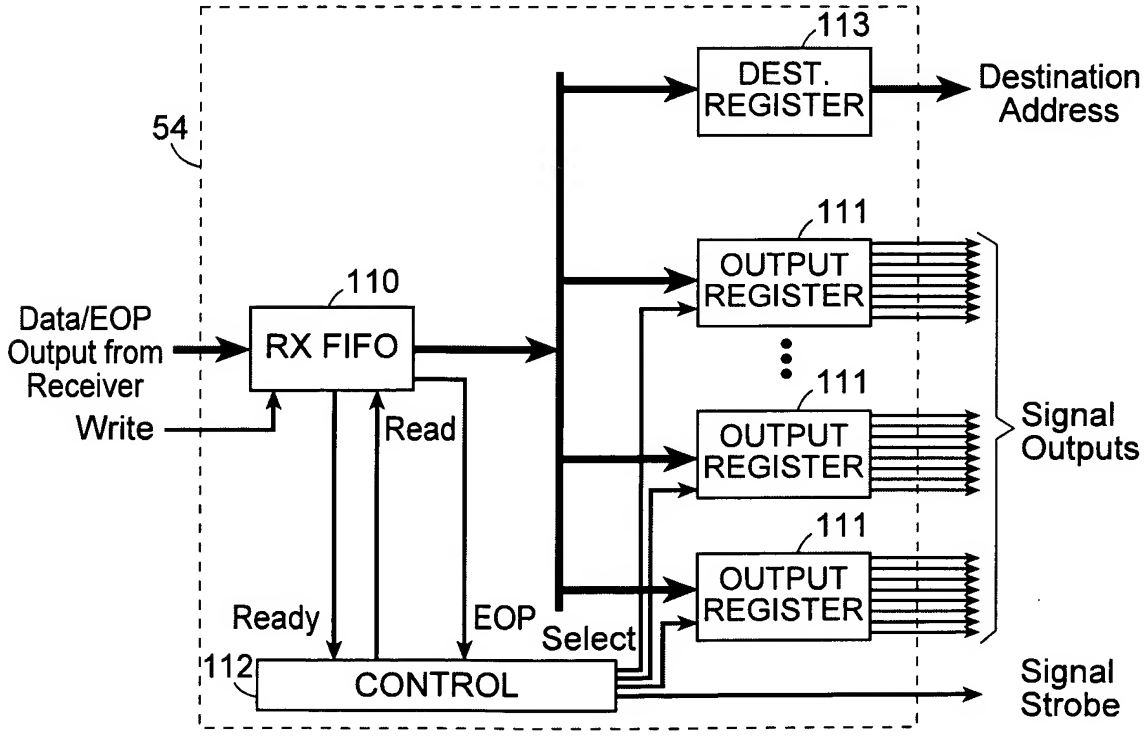

54
113
DEST. REGISTER
Destination Address
111
OUTPUT REGISTER
111
OUTPUT REGISTER
111
OUTPUT REGISTER
Signal Outputs
110
RX FIFO
Data/EOP Output from Receiver
Write
Read
Ready
EOP
Select
112
CONTROL
Signal Strobe

FIG. 8

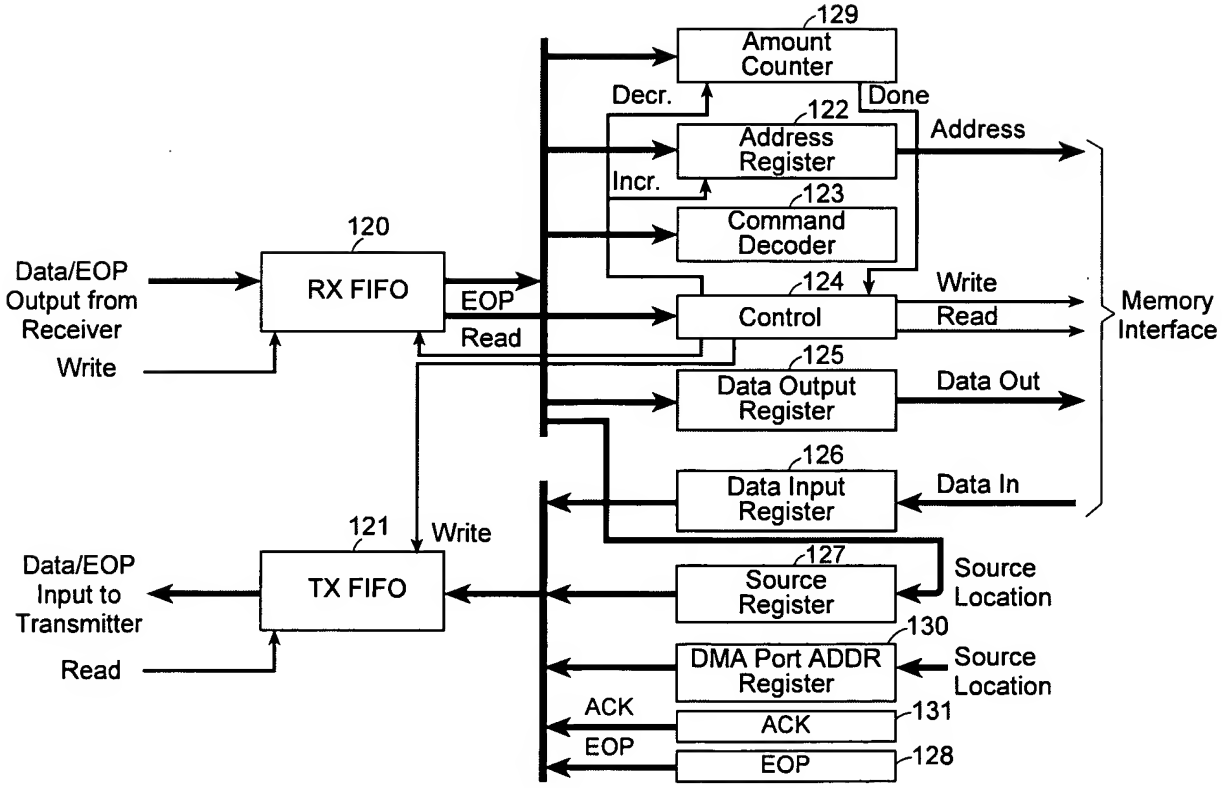

129
Amount Counter
Decr.
Done
122
Address Register
Address
Incr.
123
Command Decoder
120
Data/EOP Output from Receiver
RX FIFO
EOP
124
Control
Write
Read
Memory Interface
Write
Read
125
Data Output Register
Data Out
126
Data Input Register
Data In
121
Write
Data/EOP Input to Transmitter
TX FIFO
127
Source Register
Source Location
130
DMA Port ADDR Register
Source Location
Read
ACK
ACK
131
EOP
EOP
128

FIG. 9

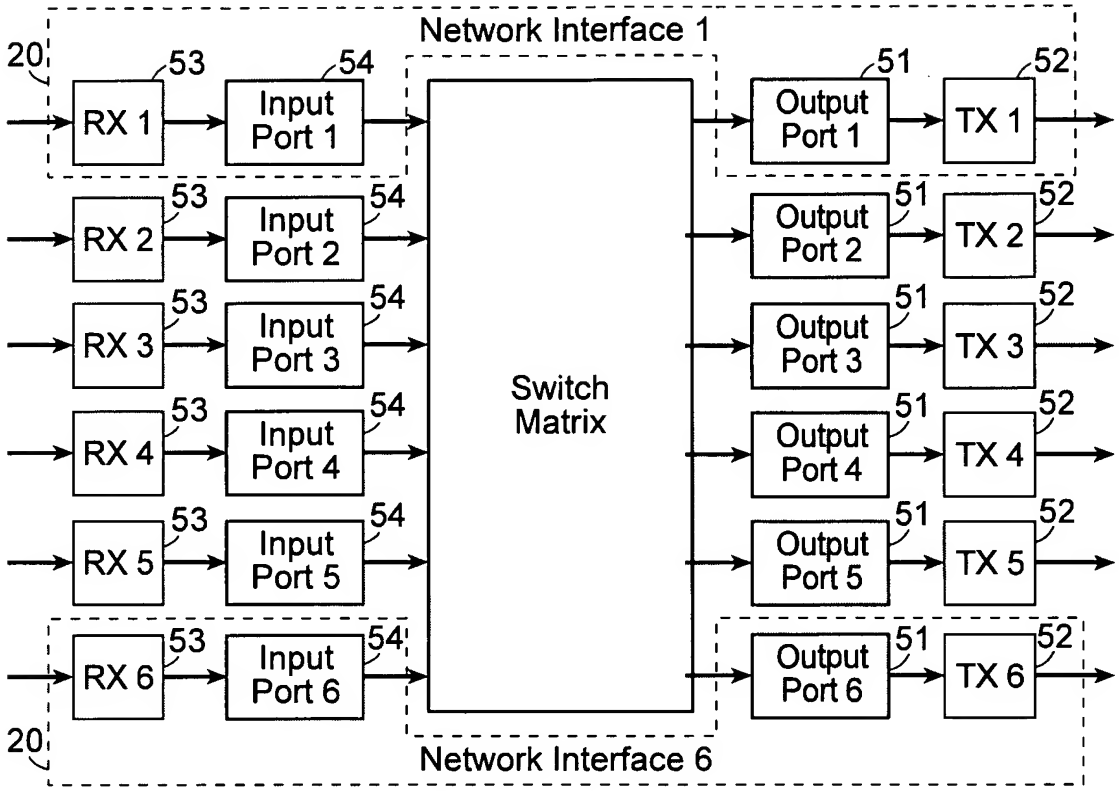

Network Interface 1
20
RX 1
53
Input Port 1
54
Output Port 1
51
TX 1
52
RX 2
Input Port 2
Output Port 2
TX 2
RX 3
Input Port 3
Output Port 3
TX 3
RX 4
Input Port 4
Output Port 4
TX 4
RX 5
Input Port 5
Output Port 5
TX 5
RX 6
Input Port 6
Output Port 6
TX 6
Switch Matrix
20
Network Interface 6

FIG. 10

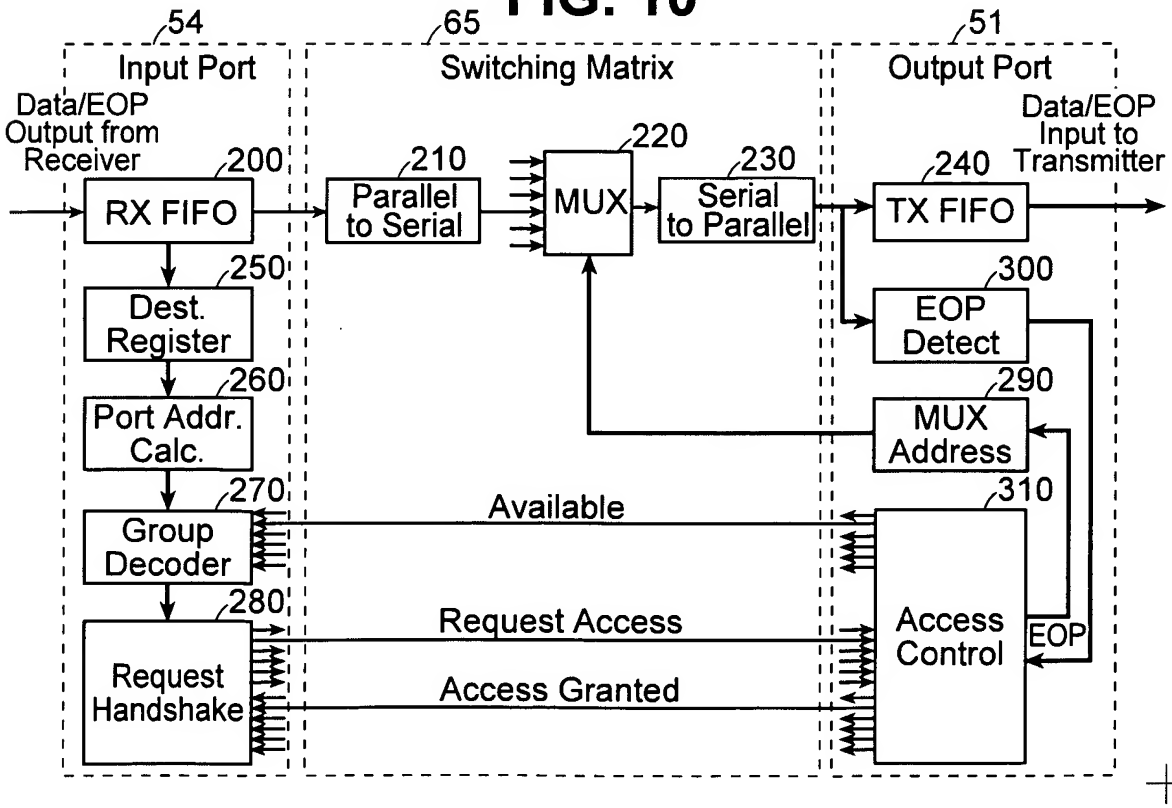

54
Input Port
65
Switching Matrix
51
Output Port
Data/EOP Output from Receiver
200
RX FIFO
210
Parallel to Serial
220
MUX
230
Serial to Parallel
240
TX FIFO
Data/EOP Input to Transmitter
250
Dest. Register
300
EOP Detect
260
Port Addr. Calc.
290
MUX Address
270
Group Decoder
Available
310
280
Request Handshake
Request Access
Access Granted
Access Control
EOP

FIG. 11

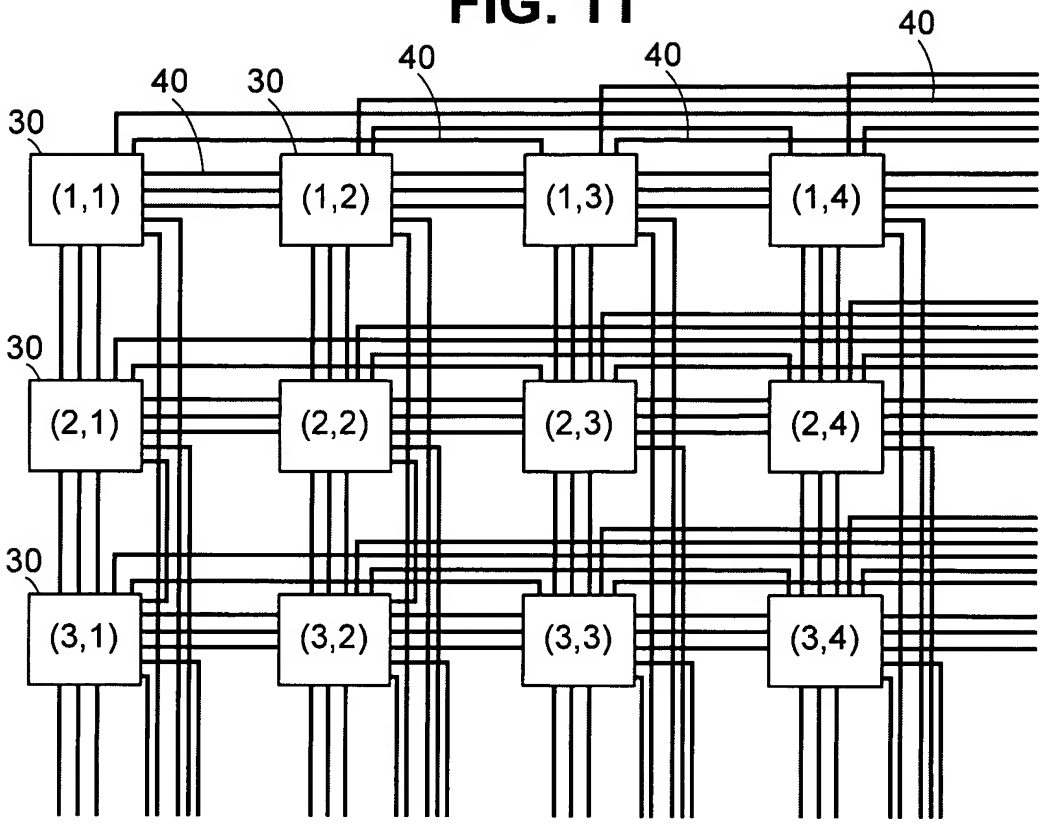
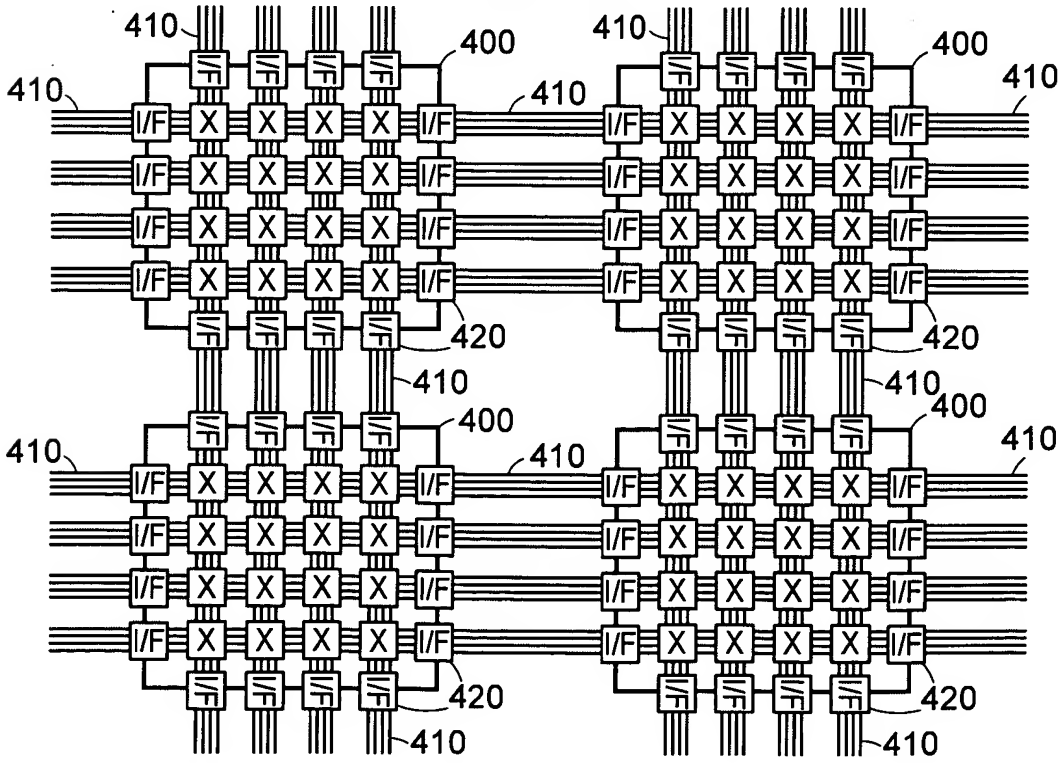

40
40
30
40
40
30
(1,1)
(1,2)
(1,3)
(1,4)
30
(2,1)
(2,2)
(2,3)
(2,4)
30
(3,1)
(3,2)
(3,3)
(3,4)

FIG. 12


410
400
410
410
400
410
I/F
X
420
410
400
410
410
400
410
420
410
420
410

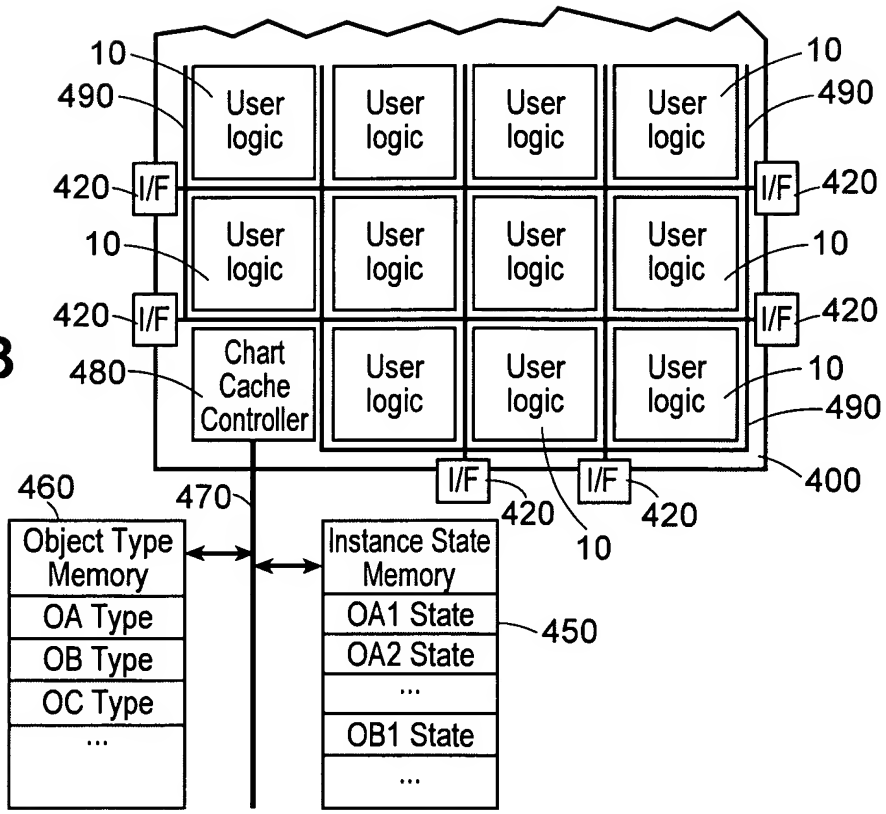

10
490
User logic
420
I/F
480
Chart Cache Controller
460
470
Object Type Memory
OA Type
OB Type
OC Type
Instance State Memory
OA1 State
OA2 State
OB1 State
450
400

FIG. 13

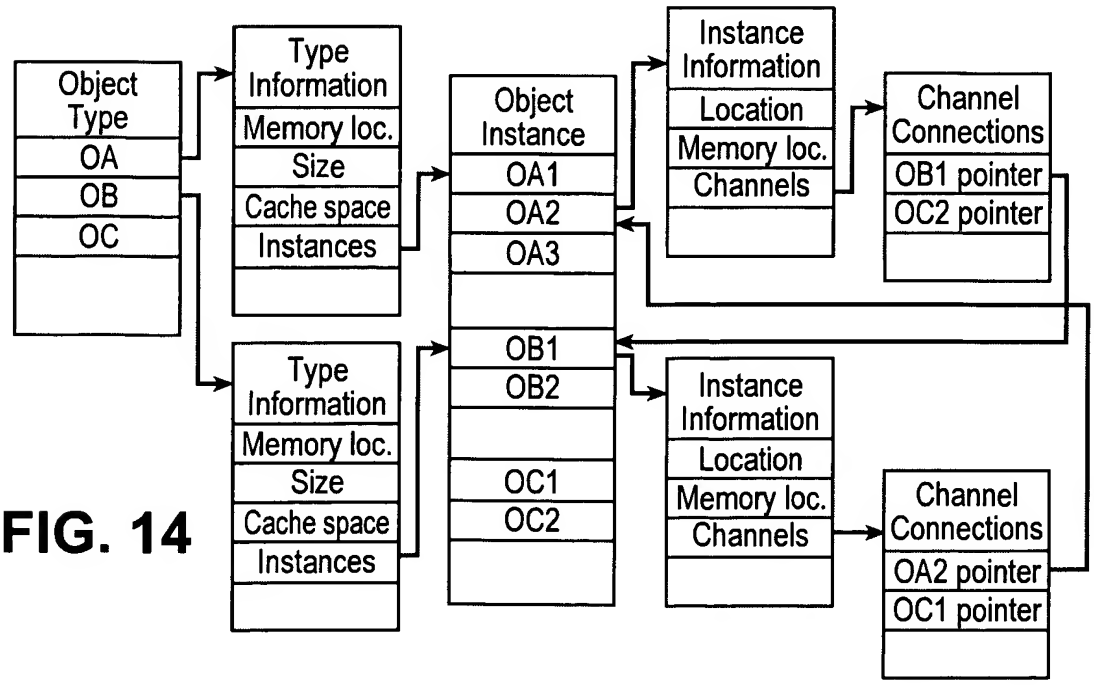

Object Type
OA
OB
OC
Type Information
Memory loc.
Size
Cache space
Instances
Object Instance
OA1
OA2
OA3
OB1
OB2
OC1
OC2
Instance Information
Location
Memory loc.
Channels
Channel Connections
OB1 pointer
OC2 pointer
OA2 pointer
OC1 pointer

FIG. 14

FIG. 15

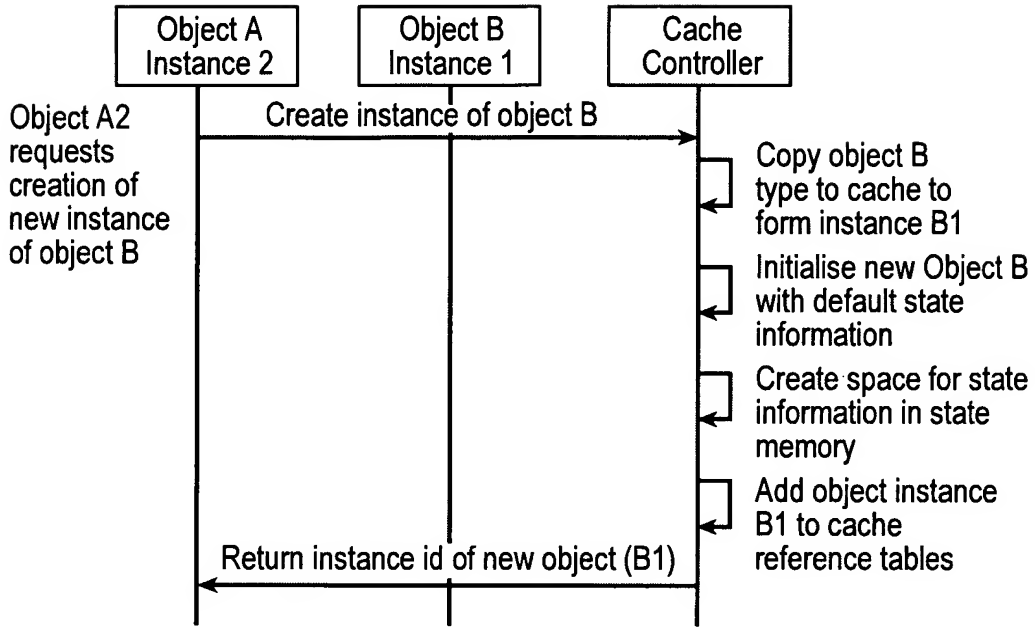

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 requests creation of new instance of object B
Create instance of object B
Copy object B type to cache to form instance B1
Initialise new Object B with default state information
Create space for state information in state memory
Add object instance B1 to cache reference tables
Return instance id of new object (B1)

FIG. 16

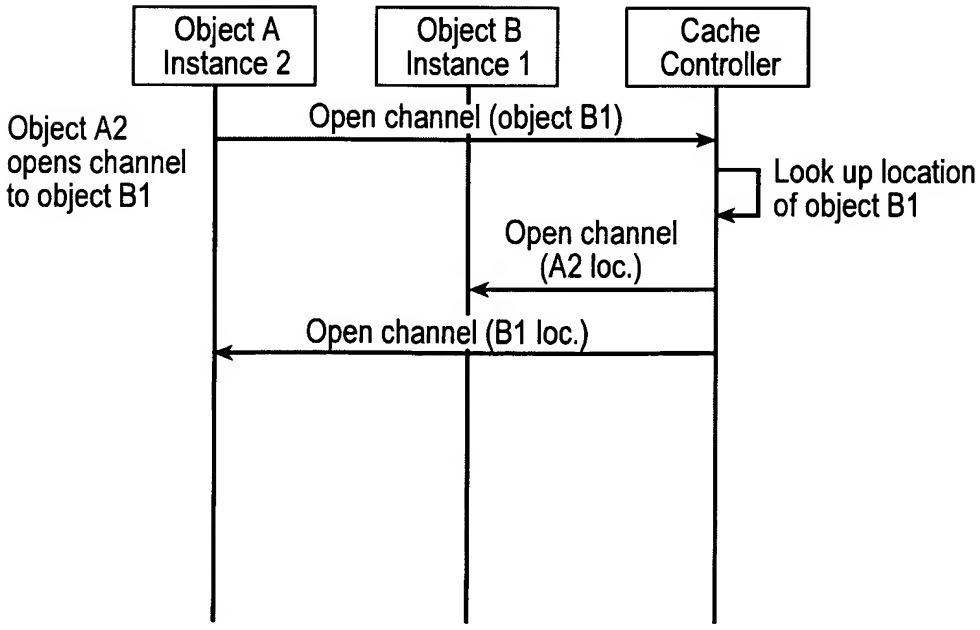

Object A Instance 2
Object B Instance 1
Cache Controller
Object A2 opens channel to object B1
Open channel (object B1)
Look up location of object B1
Open channel (A2 loc.)
Open channel (B1 loc.)

FIG. 17

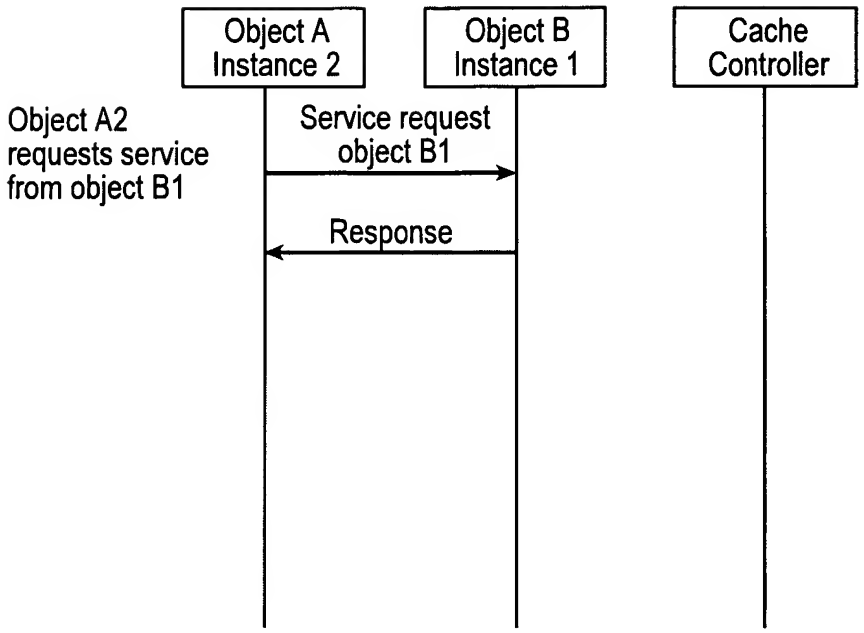

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object A2
requests service
from object B1
Service request
object B1
Response

FIG. 18

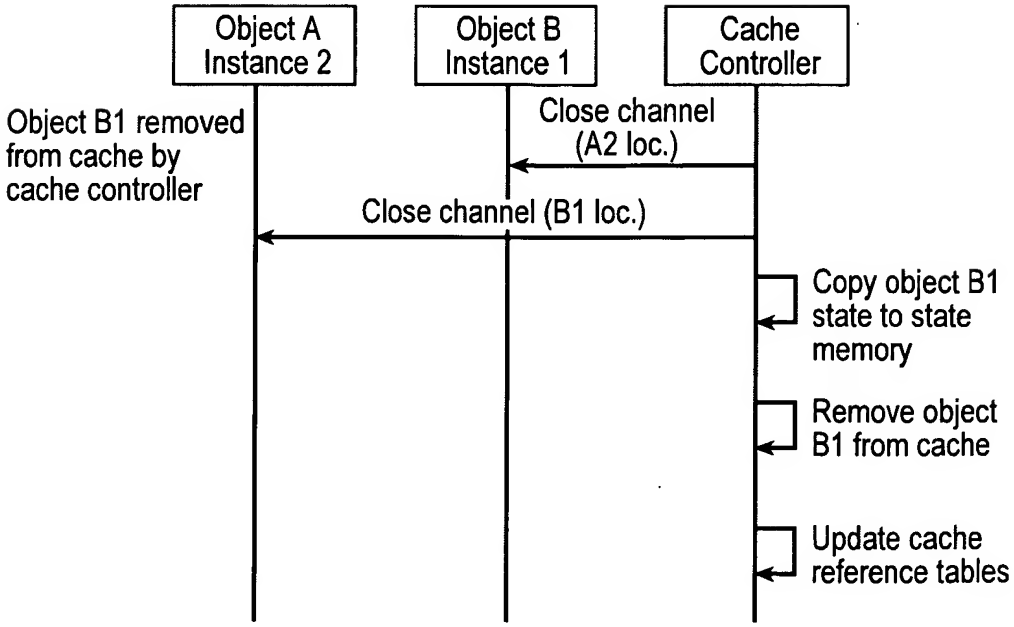

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object B1 removed
from cache by
cache controller
Close channel
(A2 loc.)
Close channel (B1 loc.)
Copy object B1
state to state
memory
Remove object
B1 from cache
Update cache
reference tables

FIG. 19

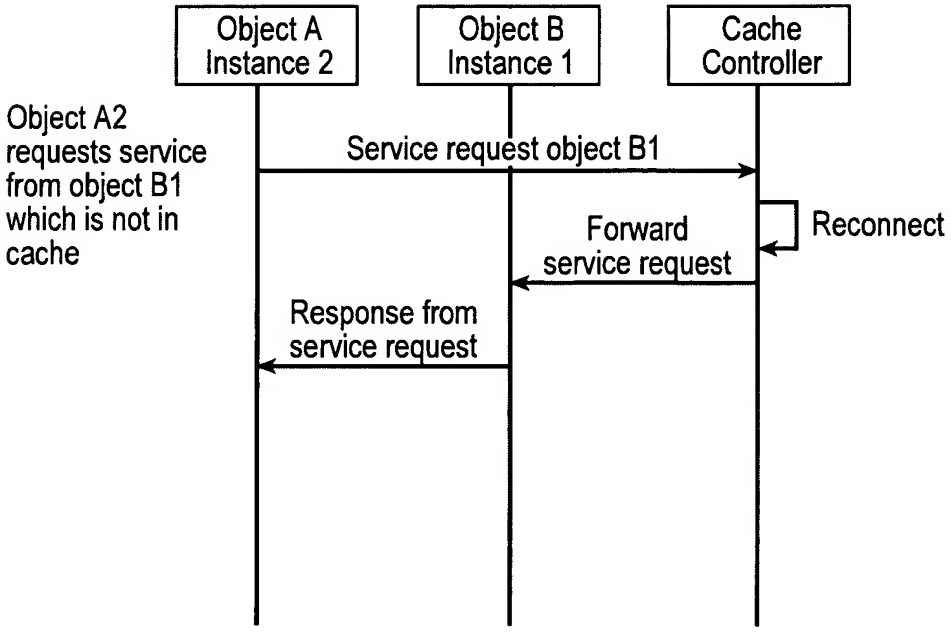

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object A2
requests service
from object B1
which is not in
cache
Service request object B1
Reconnect
Forward
service request
Response from
service request

FIG. 20

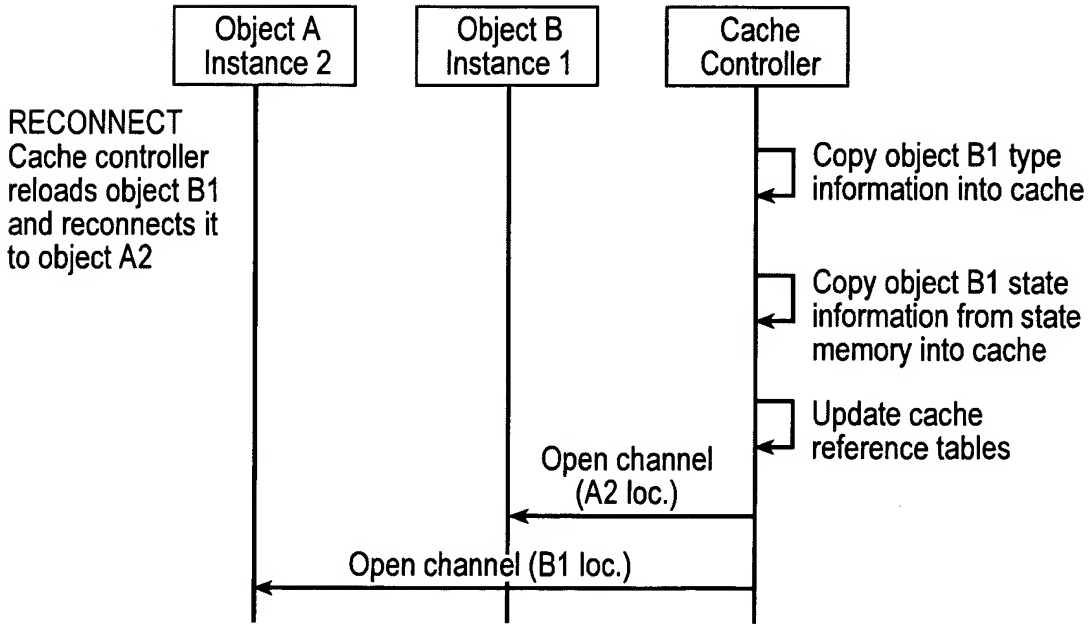

Object A
Instance 2
Object B
Instance 1
Cache
Controller
RECONNECT
Cache controller
reloads object B1
and reconnects it
to object A2
Copy object B1 type
information into cache
Copy object B1 state
information from state
memory into cache
Update cache
reference tables
Open channel
(A2 loc.)
Open channel (B1 loc.)

FIG. 21

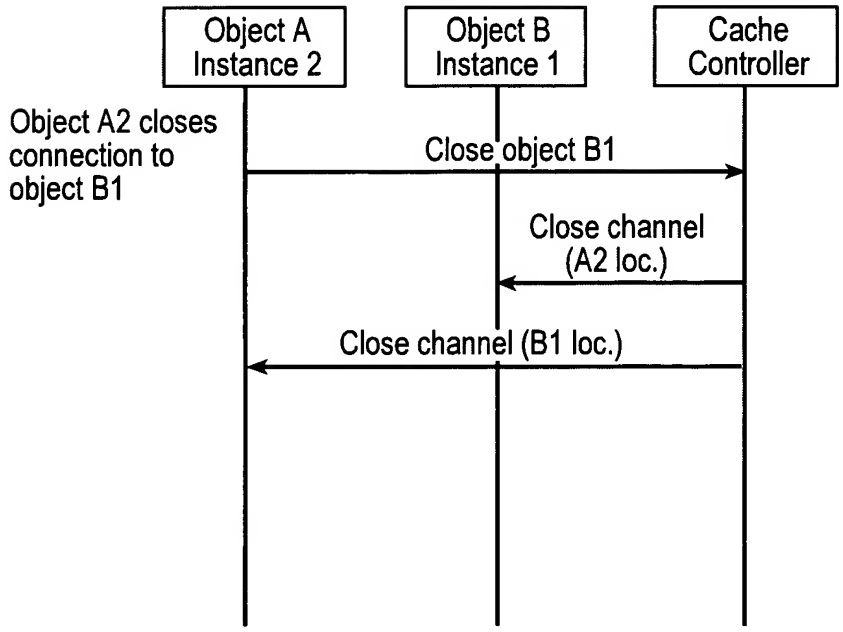

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object A2 closes
connection to
object B1
Close object B1
Close channel
(A2 loc.)
Close channel (B1 loc.)

FIG. 22

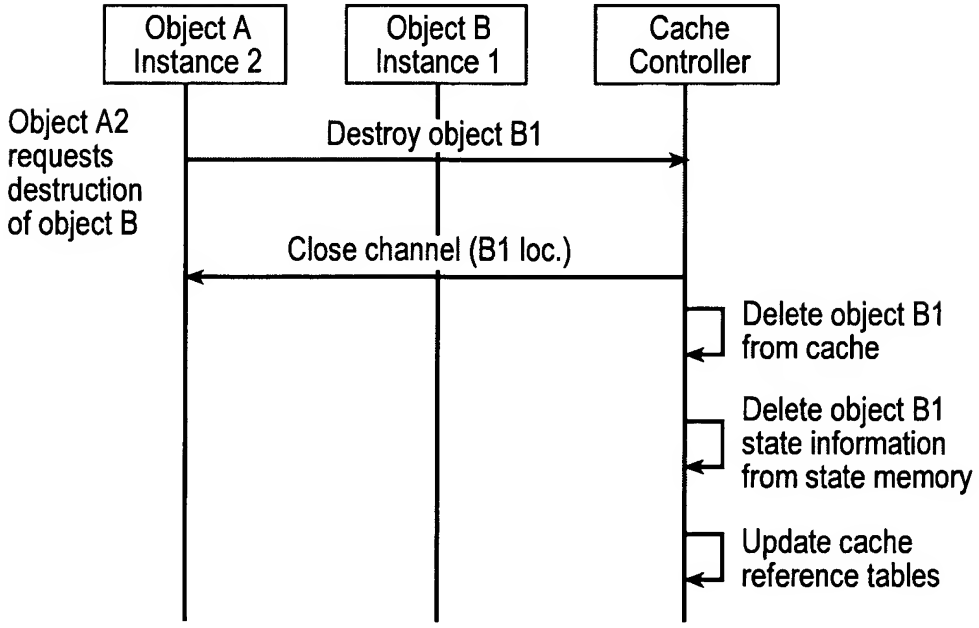

Object A
Instance 2
Object B
Instance 1
Cache
Controller
Object A2
requests
destruction
of object B
Destroy object B1
Close channel (B1 loc.)
Delete object B1
from cache
Delete object B1
state information
from state memory
Update cache
reference tables

FIG. 23

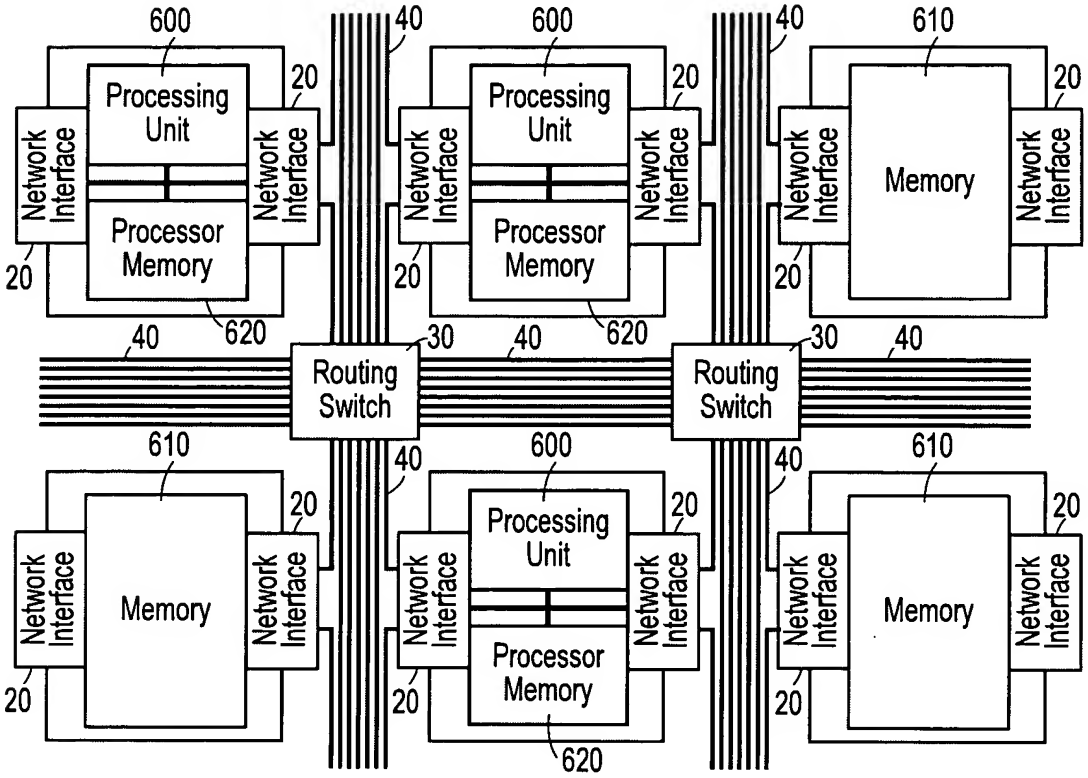
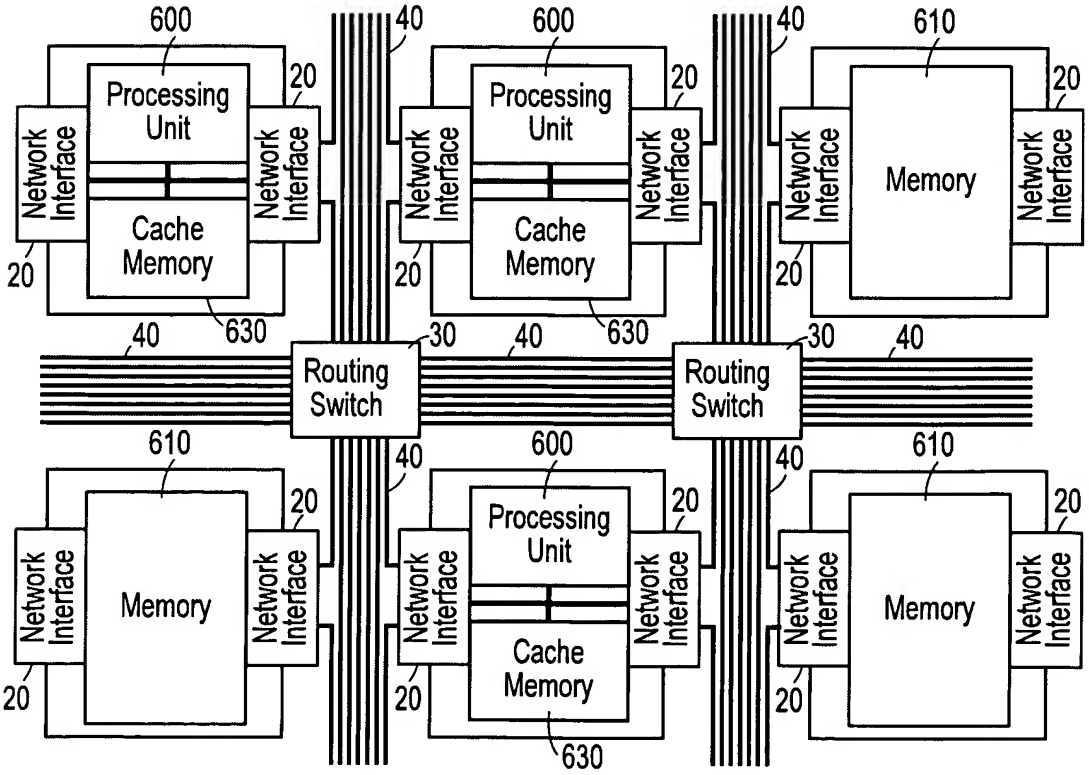

600
Processing Unit
Processor Memory
620
610
Memory
Network Interface
20
40
30
Routing Switch

FIG. 24


600
Processing Unit
Cache Memory
630
610
Memory
Network Interface
20
40
30
Routing Switch